II. REMARKS

With the above amendments, claim 19 has been amended to incorporate subject matter of base claim 1. Claim 19 has also been amended to recite "computer-readable recording medium having a program recorded thereon, wherein the program embodies the following functions...wherein the functions are executed by a computer of each of the processing modules that are operably connected to the computer-readable recording medium so as to execute the program recorded on the computer-readable recording medium," as supported by original claims 13 and 19, and as supported by ¶ [0042] of Applicants' original specification. Claim 16 has been amended to address a typographical error.

The present amendment adds no new matter to the above-captioned application.

A. The Invention

The present invention pertains broadly to an information processing method and an information processing system, and to a program, and to a computer-readable recording medium having a program recorded thereon, such as may be used to process large amounts of data. In accordance with a method embodiment of the invention, an information processing method of transmitting/receiving and processing data among a plurality of processing modules in an information processing system is provided that includes steps recited by independent claim 1. In accordance with another method embodiment of the present invention, an information processing method of transmitting/receiving and processing data among a plurality of processing modules in an information processing system is provided that includes steps recited by independent claim 2. In accordance with another method embodiment of the present invention, an information processing method of transmitting/receiving and processing data among a plurality of processing modules in an information processing system is provided that includes steps recited by independent claim 3.

In accordance with still another method embodiment of the present invention, an information processing method of transmitting/receiving and processing data among a plurality of processing modules in an information processing system is provided that includes steps recited by independent claim 4. In accordance with yet another method embodiment of the present invention, an information processing method of transmitting/receiving and processing data among a plurality of processing modules in an information processing system is provided that includes steps recited by independent claim 5.

In accordance with an apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 7. In accordance with another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 8. In accordance with another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 9. In accordance with still another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 10. In accordance with yet another apparatus embodiment of the present invention, an information processing system is provided that includes features recited by independent claim 11.

In accordance with a program embodiment of the present invention, a program for embodying functions in an information processing system is provided that includes features recited by independent claim 13. In accordance with another program embodiment of the present invention, a program for embodying functions in an information processing system is provided that includes features recited by independent claim 14. In accordance with another program embodiment of the present invention, a program for embodying functions in an information processing system is provided that includes features recited by independent claim 15. In accordance with still another program embodiment of the present invention, a program

for embodying functions in an information processing system is provided that includes features recited by independent claim 16. In accordance with yet another program embodiment of the present invention, a program for embodying functions in an information processing system is provided that includes features recited by independent claim 17.

In accordance with an embodiment of the present invention directed to a computer-readable recording medium, a computer-readable recording medium having a program recorded thereon is provided that includes features recited by independent claim 1. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

An advantage provided by various method, system, program and computer-readable recording medium embodiments of the present invention is that method, system, program and computer-readable recording medium are provided that significantly improve the speed of searching for and tabulating large amounts of data.

B. <u>The Rejections</u>

Claim 19 stands rejected under 35 U.S.C. § 101 as allegedly failing to recite statutory subject matter.

Claims 1, 7, 13 and 19 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Kahle et al. (U.S. Patent 4,870,568, hereinafter the "Kahle Patent").

Claims 2-5, 8-11 and 14-17 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Kahle Patent in view of Baum et al. (U.S. Patent 5,210,870, hereinafter, the "Baum Patent").

Claims 6, 12 and 18 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over the Kahle Patent in view of the Baum Patent, and further in view of Mock et al. (U.S. Patent 6,820,217, hereinafter the "Mock Patent").

In view of the present amendment, Applicant respectfully traverses the Examiner's rejections and requests reconsideration of the above-captioned application for the following reasons.

C. Applicant's Arguments

i. The Section 101 Rejection

The Examiner contends that claim 19 fails to recite statutory subject matter falling within the scope of 35 U.S.C. § 101 because a "computer-readable recording medium" allegedly covers transitory forms of signal transmission when interpreted using the broadest reasonable interpretation (See Office Action, dated May 6, 2011, at 2, lines 10-15). The Examiner's contention is incorrect as both a matter of fact and as a matter of law.

Applicant encourages the Examiner to give the broadest reasonable interpretation to the phrase "computer-readable recording medium" that is consistent with Applicant's specification. In re Hyatt, 54 U.S.P.Q.2d 1664, 1667 (Fed. Cir. 2000). In this case, the term "computer-readable recording medium" is used in Applicant's specification in accordance with its ordinary meaning in the art. As evident from Exhibit A filed herewith, which is a copy of "Recording medium – Definition | WordIQ.com," *at* http://98.158.195.207/definition/Recording_medium (downloaded August 26, 2011, two pages), the term "recording medium," according to its broadest reasonable interpretation, pertains to **a physical material** that holds information expressed in any of the existing recording formats. All of the "computer-readable" examples provided by Exhibit A are devices for holding information expressed in any of the existing computer-readable recording formats. Thus, as would be appreciated by those of ordinary skill in the art, a "computer-readable **recording medium**" cannot be reasonably interpreted to cover "transitory forms of signal transmission" because transitory forms of signal transmission are not composed of

physical material. Therefore, the Examiner's rejection under 35 U.S.C. § 101 is untenable and must be withdrawn as a matter of fact once the broadest reasonable interpretation of the term "computer-readable recording medium" is made.

Second, the term "computer-readable recording medium" cannot be construed in a vacuum, but should be construed in the context of the claim. In this case, claim 19 actually recites a

> "computer-readable recording medium having a program recorded thereon, wherein the program embodies the following functions…wherein the functions are executed by a computer of each of the processing modules that are operably connected to the computer-readable recording medium so as to execute the program recorded on the computer-readable recording medium."

In the context of claim 19, a computer of each of the processing modules is operably connected to the computer-readable recording medium so that a plurality of computers are operably connected to the computer-readable recording medium. A transitory form of signal transmission is not operably connected to multiple computers. Therefore, it is not reasonable to construe a transitory form of signal transmission as having an operable connection with multiple computers.

In addition, it is a well-settled proposition that computer programs embodied in a tangible medium are patentable subject matter under 35 U.S.C. § 101. In re Beauregard, 53 F.3d 1583, 1584 (Fed. Cir. 1995). As evident from Exhibit A, a "computer-readable recording medium" is, by definition, a tangible medium (i.e., a "physical material"). Therefore, a "computer-readable recording medium" as recited by claim 19 is statutory subject matter falling within the scope of 35 U.S.C. § 101.

For all of the above reasons, a "computer-readable recording medium" as recited by independent claim 1, as amended, is statutory subject matter falling within the scope of 35 U.S.C. § 101.

ii. The Section 102 Rejection

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). In this case, the Examiner has failed to establish a prima facie case of anticipation against any claim of the above-captioned application because the Kahle Patent does not teach, or even suggest, each and every claimed limitation, arranged as in the claims.

iii. The Kahle Patent

The Kahle Patent discloses a "method for searching a database system including parallel processors," which may include a search and retrieval process as shown in Fig. 3 and a query forming process as shown in Fig. 4. Figs. 3 and 4 are reproduced below.

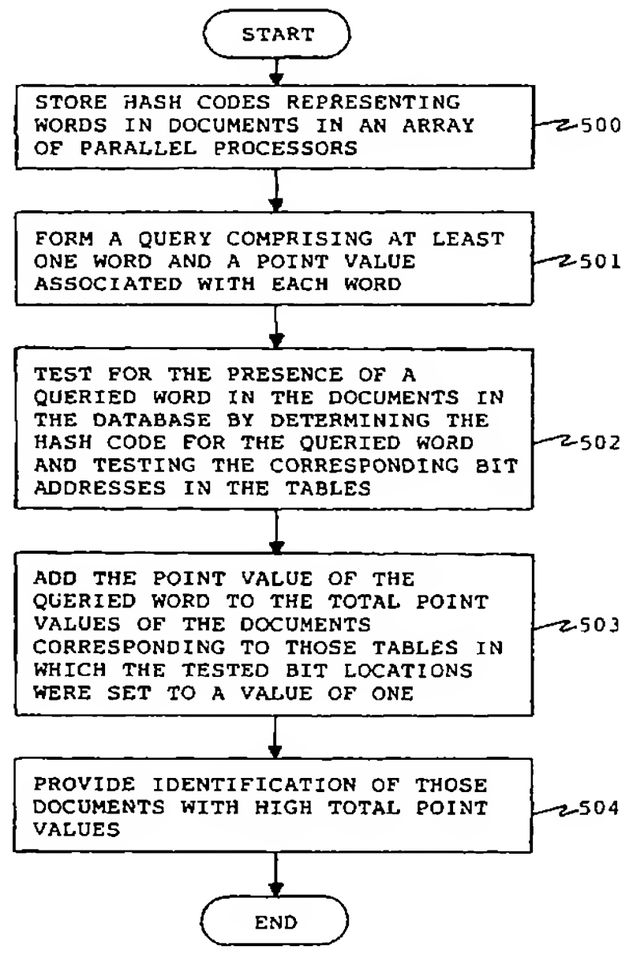

FIG. 3

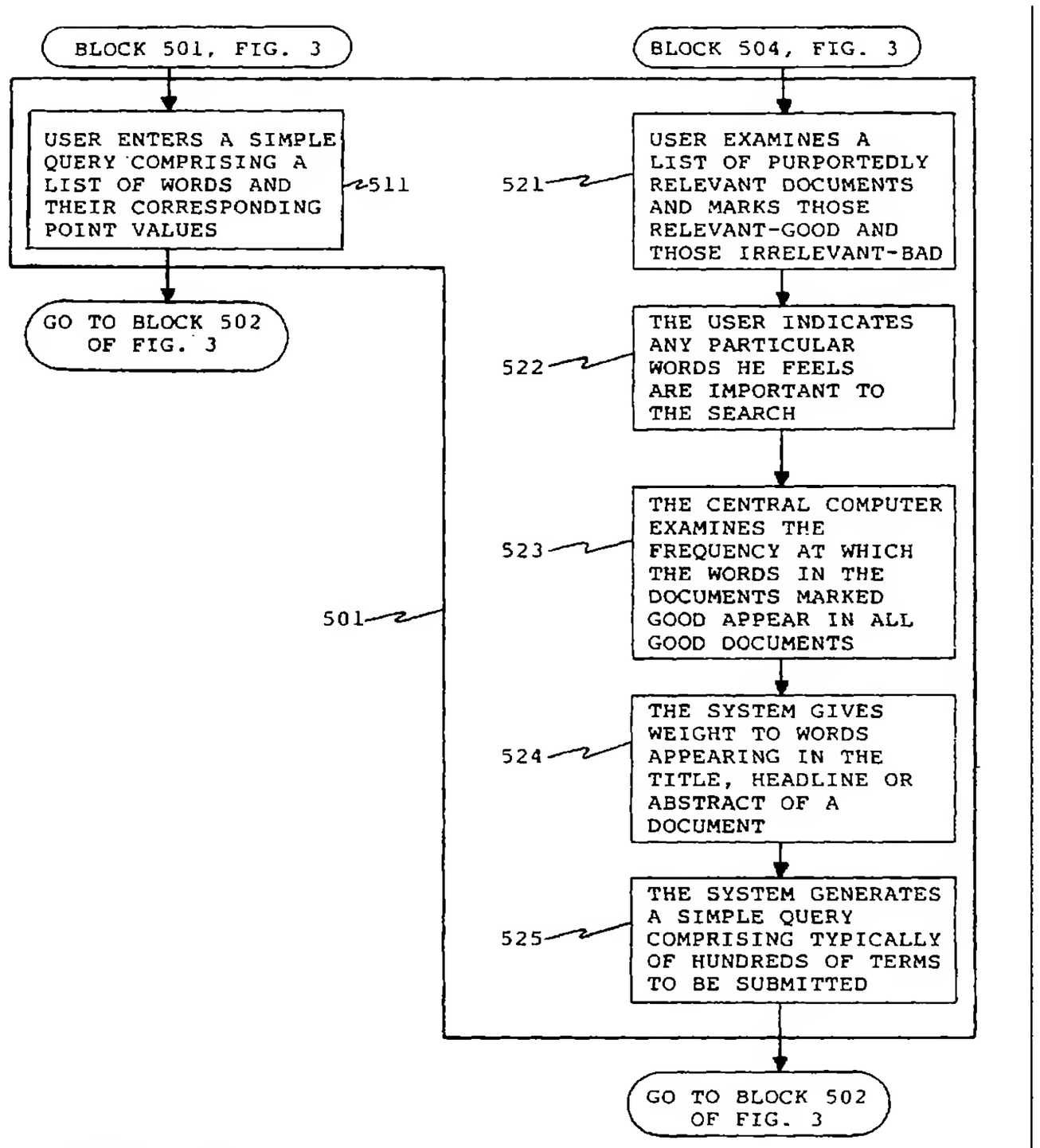

FIG. 4

The Kahle Patent discloses a method to operate on a single instruction multiple data (SIMD) computer for searching for relevant documents in a database, which allegedly makes it possible to perform thousands of operations in parallel (See Abstract of the Kahle Patent).

The Kahle Patent discloses that words of each document are stored by surrogate coding in tables in one or more of the processors of the SIMD computer, and to determine which documents of the database contain a word that is the subject of a query, a query is broadcast from a central computer to all the processors and the query operations are simultaneously performed on the documents stored in each processor (See Abstract of the Kahle Patent). The Kahle Patent discloses that results of the query are then returned to the central computer, and after all the search words have been broadcast to the processors and point values accumulated as appropriate, the point values associated with each document are reported to the central

computer (See Abstract of the Kahle Patent). According to the Kahle Patent, documents with the largest point values are then ascertained and their identification is provided to the user (See Abstract of the Kahle Patent).

The Kahle Patent does not teach, or even suggest, (i) "allowing each of the processing modules to increase a counter corresponding to a value of the first list by one when a value of the second list is identical to the value of the first list" as recited by independent claim 1, (ii) "a means that, when a value of the second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by claim 7, and (iii) "a function that, when a value of a second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by independent claims 13 and 19. According to the present invention, identical values of data count (i.e., the number of matched values is counted), which does not depend upon FAST structure. In accordance with the present invention, all of the processors are equivalent and no central computer (10), such as disclosed by the Kahle Patent, at col. 4, lines 15-25, is required.

According to the present invention, each processing module transmits data stored in the processing module to other processing modules, and receives data stored in other processing modules in order to process data in each processing module respectively (i.e., independently). More specifically, the processing embodiments according to claims 1, 7 and 13 involve counting identical values, and the processing embodiments according to claims 2, 8 and 14 also involve counting identical values, but performed in a different manner, and the processing embodiments according to claims 3, 4, 9, 10, 15 and 16 involve value ordering (ranking), and the processing embodiments recited by claims 5, 11 and 17 involve cancellation of identical values and value ordering (ranking).

The Kahle Patent discloses, however, a central computer (10) that is the main apparatus for judging and controlling, and inevitably is the main component according the Kahle that performs all processing (Kahle Patent, col. 4, lines 15-25; col. 6, lines 66-68; and col. 7, lines 1-13 and lines 25-28). On the other hand, in accordance with the present invention, no specific function or role is assigned to a specific processor so that all processors can operate completely in parallel to perform each processing. Furthermore, the Examiner is incorrect when asserting that the "one or more tables" retained in the processors/memories of the SIMD computer, as disclosed by the Kahle Patent at col. 6, lines 53-57, constitutes a "first list" sent from each processor as claimed (See Office Action, dated May 6, 2011, at 3, lines 14-15).

For all of the above reasons, the Examiner has failed to establish a prima facie case of anticipation against claims 1, 7, 13 and 19, or against any other claim, of the above-captioned application.

iv. The Section 103 Rejections

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has not established a prima facie case of obviousness against claims 1-19 of the above-captioned application because the combined disclosures of the Kahle Patent, the Baum Patent, and the Mock Patent does not teach, or even suggest, each and every claimed limitation, arranged as in the claims.

v. <u>The Kahle Patent</u>

The disclosure of the Kahle Patent is discussed above. As admitted by the Examiner (Office Action, mailed May 6, 2011, at 5, lines 3-6; and at 10, line 10), the Kahle Patent does not teach, or suggest, (iv)

> "allowing each of the processing modules to transmit a first list composed of pairs of a value and a number of value stored in the memory of each of the processing modules to the other processing modules in the information processing system;
>
> allowing each of the processing modules to receive at least one second list composed of the pairs of value and the number of value transmitted to each of the processing modules from the other processing modules;
>
> allowing each of the processing modules to compare values of the second list with values of the first list; and
>
> allowing each of the processing modules to increase a counter corresponding to a value of the first list by the number of the values corresponding to a value of the second list, when the value of the second list is identical to the value of the first list,"

as recited by claim 2, and (v)

> "wherein each of the processing modules stores table-format data represented by an array of records including field values contained in an information field in the memory in a form of a value list in which the field values are stored in order of field value numbers corresponding to the field values and an array of pointers in which information for specifying the field value numbers is stored in order of records, and
>
> wherein said list composed of the values is said value list that constructs the table-format data,"

as recited by claim 6.

vi. <u>The Baum Patent</u>

The Baum Patent discloses a "database sort and merge apparatus with multiple memory arrays having alternating access" in which a processor (a "Database Engine") functioning as a coprocessor attached to a central processing complex provides execution of the functions required for database processing: sorting, merging, joining, searching and manipulating fields in a host memory system (See Abstract of the Baum Patent, and col. 4, lines 65-67). The Baum Patent discloses the following specialized functional units of the

Database Engine (300): a memory interface and field extractor/assembler (308), a Predicate Evaluator (304), a combined sort/merge/join unit (302), a hasher (306), and a microcoded control processor (310), which are all centered around a partitioned Working Store (312), (See Abstract of the Baum Patent, col. 4, line 65, to col. 5, line 30, and Fig. 3). The Baum Patent discloses that each functional unit is pipelined and optimized according to the function it performs, and executes its portion of the query efficiently, and that all functional units execute simultaneously under the control processor (310) to achieve desired results (See Abstract of the Baum Patent). According to the Baum Patent, many different database functions can be performed by chaining simple operations together, and the processor can effectively replace the CPU bound portions of complex database operations with functions that run at the maximum memory access rate, thereby improving performance on complex queries (See Abstract of the Baum Patent).

However, the Baum Patent does not teach, or even suggest, (i) "allowing each of the processing modules to increase a counter corresponding to a value of the first list by one when a value of the second list is identical to the value of the first list" as recited by independent claim 1, (ii) "a means that, when a value of the second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by claim 7, and (iii) "a function that, when a value of a second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by independent claims 13 and 19. As admitted by the Examiner (Office Action, dated May 6, 2011, at 10, line 10), the Baum Patent also does not teach, or even suggest, (iv)

> "wherein each of the processing modules stores table-format data represented by an array of records including field values contained in an information field in the memory in a form of a value list in which the field values are stored in order of field value numbers corresponding to the field values and an array of pointers in which information for specifying the field value numbers is stored in order of records, and

wherein said list composed of the values is said value list that constructs the table-format data,"

as recited by claim 6. Furthermore, the Examiner is incorrect when asserting that the Baum Patent discloses at col. 22, lines 31-34, a query, which is analyzed by the central computer, constitutes a "second list" received by each of the processors of the present invention (See Office Action, dated May 6, 2011, at 5, lines 7-15).

vii. <u>The Mock Patent</u>

The Mock Patent discloses a "method and apparatus for data recovery optimization in a logically partitioned computer system," in which a protection utility for compiled data in a computer system, having dynamically configurable logical partitions, determines the time for rebuilding compiled data, and selectively stores data in a form not requiring rebuild to meet a pre-specified recovery time limit (See Abstract of the Mock Patent). According to the Mock Patent, if the configuration changes, the protection strategy is automatically migrated to adapt to the new configuration and, preferably, the compiled data is multiple database indexes, which are selectively logged to reduce recovery time (See Abstract of the Mock Patent). The Mock Patent discloses that logging is selectively discontinued or extended responsive to changes in partition configuration, thereby allowing a gradual migration to the target recovery time using the new set of configured resources (See Abstract of the Mock Patent).

However, the Mock Patent does not teach, or suggest, (i) "<u>allowing each of the processing modules to increase a counter corresponding to a value of the first list by one when a value of the second list is identical to the value of the first list</u>" as recited by independent claim 1, (ii) "<u>a means that, when a value of the second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one</u>" as recited by claim 7, and (iii) "<u>a function that, when a value of a second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list</u>

by one" as recited by independent claims 13 and 19. In addition, the Mock Patent does not teach, or even suggest, (iv)

> "wherein each of the processing modules stores table-format data represented by an array of records including field values contained in an information field in the memory in a form of a value list in which the field values are stored in order of field value numbers corresponding to the field values and an array of pointers in which information for specifying the field value numbers is stored in order of records, and
>
> wherein said list composed of the values is said value list that constructs the table-format data,"

as recited by claim 6.

The Examiner relies upon col. 2, lines 65-67 and col. 3, lines 1-4, as passages allegedly teaching the subject matter of claim 6 (See Office Action, dated May 6, 2011, at 10, line 10, to 11, line 4). However, the Examiner's contention is incorrect for the following reasons.

The Mock Patent, at col. 2, line 56, to col. 3, line 4, actually states the following:

> "One common type of compiled data is a database index. Large computer systems often support very large databases. Information may be selectively extracted from such databases by means of various database queries. Since these queries can consume significant processor resources, indexes of data are established to support queries of specific fields in the database. An index is typically associated with a specific field in the database records, and orders the records in the database according to the value in that field. For example, the index may be an ordered list of pointers to database records, where the pointers are ordered according to a field value. Alternatively, the index may be an ordered list of value and pointer pairs, where the value is the value in the associated field, and the pointer a pointer to the database record, the ordered list being sorted according to field value." (emphasis added).

However, as would be appreciated by those of ordinary skill in the art, the value list and array of pointers of the embodiment recited by claim 6 are substantially different from the database index disclosed by the Mock Patent in that, for the embodiment of claim 6, they are provided for each field, whereas the index disclosed by Mock is provided for a specific field within database records.

viii. Summary of the Disclosures

For the reasons discussed above, the combined disclosures of the Kahle Patent, the Baum Patent and the Mock Patent do not teach, or even suggest, (i) "allowing each of the processing modules to increase a counter corresponding to a value of the first list by one when a value of the second list is identical to the value of the first list" as recited by claim 1, (ii) "a means that, when a value of the second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by claim 7, (iii) "a function that, when a value of a second list is identical to a value of the first list, increases a counter corresponding to the identical value of the first list by one" as recited by claims 13 and 19, and (iv)

> "wherein each of the processing modules stores table-format data represented by an array of records including field values contained in an information field in the memory in a form of a value list in which the field values are stored in order of field value numbers corresponding to the field values and an array of pointers in which information for specifying the field value numbers is stored in order of records, and
>
> wherein said list composed of the values is said value list that constructs the table-format data,"

as recited by claim 6.

With respect to claim 2, the "one or more tables" retained in the processors/memories of the SIMD computer disclosed by the Kahle Patent does not constitute a "first list" sent from each processor in accordance with the claimed embodiment, and the "query" analyzed by the central computer disclosed by the Baum Patent does not constitute a "second list" received by each of the processors in accordance with the embodiment recited by claim 2. Therefore, the combined disclosures of the Kahle Patent, the Baum Patent and the Mock Patent, also do not teach, or suggest, (v)

> "allowing each of the processing modules to transmit a first list composed of pairs of a value and a number of value stored in the memory of each of the processing modules to the other processing modules in the information processing system;
>
> allowing each of the processing modules to receive at least one second

> list composed of the pairs of value and the number of value transmitted to each of the processing modules from the other processing modules;
>
> allowing each of the processing modules to compare values of the second list with values of the first list; and
>
> allowing each of the processing modules to increase a counter corresponding to a value of the first list by the number of the values corresponding to a value of the second list, when the value of the second list is identical to the value of the first list,"

as recited by claim 2. Claims 2, 8 and 14 are directed to an aspect of the invention pertaining to an identical values count, and claims 3, 4, 9, 10, 15 and 16 are directed to another aspect of the invention pertaining to value ranking in which values retained in each module are ranked in a predetermined manner, and claims 5, 11 and 17 are directed to yet another aspect of the invention pertaining to identical values cancellation and ordering. Because the Examiner misconstrues the subject matter disclosed by the Kahle Patent, as discussed above, the Examiner's subsequent obviousness rejections of claims 2-5, 8-11 and 14-17 are also untenable and should be withdrawn.

For all of the above reasons, the Examiner has not established a prima facie case of obviousness against claims 1-19 of the above-captioned application.

III. CONCLUSION

For all of the above reasons, claims 1-19 as amended each recites statutory subject matter in compliance with 35 U.S.C. § 101. In addition, the Examiner has not established either a prima facie case of anticipation under 35 U.S.C. § 102, or a prima facie case of obviousness under 35 U.S.C. § 103, against claims 1-19, as amended, because the Kahle Patent, when considered alone or in combination with the Baum Patent and the Mock Patent, fails to teach, or even suggest, each and every claimed limitation, arranged as in the claims.

For all of the above reasons, claims 1-19 as amended are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below-signed attorney for Applicant.

Respectfully submitted,

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